



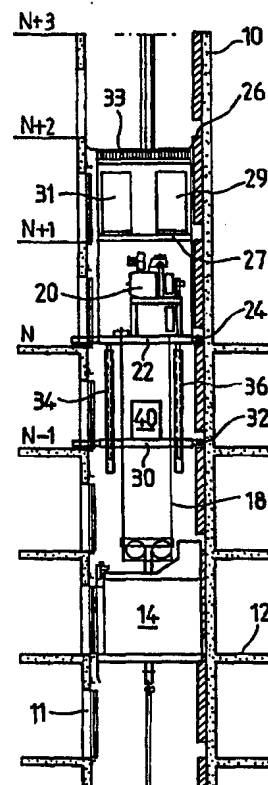
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/US99/14955 <b>(22) International Filing Date:</b> 1 July 1999 (01.07.99) <b>(30) Priority Data:</b> 98/10121                      6 August 1998 (06.08.98)                      FR <b>(71) Applicant (for all designated States except US):</b> OTIS ELEVATOR COMPANY [US/US]; Intellectual Property Dept., 10 Farm Springs, Farmington, CT 06032-2568 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> FERRARY, Jean-Marc [FR/FR]; 5, rue de Chatelieu, F-75037 Paris (FR). MENARD, Jean-Pierre [FR/FR]; 147, avenue Général Leclerc, F-92340 Bourg la Reine (FR). <b>(74) Agents:</b> HENLEY, Randy, G. et al.; Otis Elevator Company, Intellectual Property Dept., 10 Farm Springs, Farmington, CT 06032-2568 (US).		<b>(81) Designated States:</b> CN, DE, JP, US.  <b>Published</b> <i>With international search report.</i>

**(54) Title:** A DEVICE AND METHOD FOR INSTALLING ELEVATOR EQUIPMENT

**(57) Abstract**

This device includes a machinery platform (22) which carries the elevator machinery (20) and is mounted to slide in said shaft (10), where said platform is equipped with laterally retractable catches (24) whereby it can be carried by one of several supports (26) formed in the shaft to the different levels serviced by the elevator, a thrust platform (30) mounted at least one level lower than the machinery platform, and which is also equipped with retractable catches (32) whereby it can be carried by one of said supports (26), and a jacking device (34, 36) linking the thrust platform (30) to the machinery platform (22), which are able on the one hand to push the machinery platform to raise it at least one level, and on the other hand to pull the thrust platform to raise it one level while being carried by the machinery platform which rests of one of said supports (26).



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# INTERNATIONAL SEARCH REPORT

Inter. Application No.

PCT/US 99/14955

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B66B19/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B66B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 217 296 A (RAPID RISE N V) 25 October 1989 (1989-10-25) abstract page 7, line 4 - page 9, last paragraph page 10, last paragraph - page 11, paragraph 1 claims; figures	1-6
A	EP 0 457 152 A (OTIS ELEVATOR CO) 21 November 1991 (1991-11-21) abstract figures 4,5	1,5,6
A	FR 2 694 279 A (OTIS ELEVATOR CO) 4 February 1994 (1994-02-04) the whole document	1-6

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/US 99/14955

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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FR 2694279 A	04-02-1994	NONE	

## A Device And Method For Installing Elevator Equipment

### Technical Field

5 This invention concerns a method and a device for moving machinery along an elevator shaft in a tall building in proportion to the progressive construction of new floors.

### Background of the Invention

10 When constructing a building, the workers must be able to quickly access the highest level of the building and to move freely between the already constructed levels. At present there are two possibilities for carrying out these movements:

- either temporarily install a freight elevator which moves along the facade outside of the building; or

- 15 - build a final elevator installation on the inside of the building, which is mounted in a permanent shaft raised in proportion to the progressive construction of new floors, and where this installation can be used by the workers during the construction.

20 During the past 25 years the applicant has developed and used an elevator installation of the second type mentioned above. This installation comprises a machinery which is periodically hoisted by the on-site building gantry to the level of the last constructed floor.

25 However, since this operation takes approximately one shift during which time the gantry is not used for transporting materials, and is therefore not used efficiently, hoisting the machinery each time a new floor is constructed was avoided, and thus the operation was not performed until after several new floors had been built, generally after every fifth floor. This represented a loss of time for the workers to reach the working level from the last level which was serviced by the elevator, and a loss of money for the owner.

Furthermore, in order not to delay the work, this operation had to be performed after normal working hours, but then the labor cost of this shift is higher than during normal work hours. Therefore there is a need to find a device which allows the machinery to be lifted in a very short time without using the on-site building gantry.

#### Summary of the Invention

These objectives and advantages are attained by the invention with a lifting device for the machinery of an elevator, characterized in that it includes:

10 a machinery platform which carries the machinery and is mounted to move in said shaft, where the machinery platform is equipped with retractable catches whereby it can be supported by one of several supports which are in the shaft to the different levels serviced by the elevator,

15 a thrust platform also mounted to move in the shaft, where said thrust platform is mounted lower in the shaft than the machinery platform and is also equipped with retractable catches whereby it can be supported by one of said supports,

20 and a jacking device linking the thrust platform to the machinery platform, which is able to move the machinery platform to raise it while it is supported by the thrust platform, and to move the thrust platform to raise it while being supported by the machinery platform.

The jacking device may be composed of pneumatic, hydraulic or electric jacks, or also of racks which are driven by a motor.

25 The lifting device of the invention permits the raising of the machinery platform without having to use the on-site building gantry, and therefore without the need of diverting gantry operations to this task. An operation cycle only takes a few hours so that the machinery platform can be moved each time a new floor has been constructed. Thus this lifting system saves the workers' fatigue and achieves a great time saving and consequently an appreciable reduction in the cost of constructing the

building.

#### Brief Description of the Drawings

5 Other characteristics and advantages of the invention will become apparent when reading the following description of a realization mode which refers to the attached drawings wherein:

- Fig. 1 is a vertical cut through an elevator shaft in a building under construction, equipped with a lifting device located at a starting level;
- 10 Fig. 2 shows the lifting device in an intermediate phase of its operation; and
- Fig. 3 illustrates the lifting device in its final state after the machinery platform has been hoisted one floor.

#### Best Mode for Carrying Out the Invention

15 The figures show an elevator installation of a building under construction. This installation comprises a shaft 10 of which only the upper part is illustrated. The shaft must be extended upwards in proportion to new floors that are progressively constructed. It has openings which are closed by doors 11 that provide access to landings 12 located on the different constructed levels.

20 The shaft contains an elevator car 14 and a counterweight 16 mounted to slide therein, which are connected by cables 18 and are driven by a machinery 20. The latter is mounted on a prefabricated platform 22 which can be carried to the last constructed floor in the building by means which will be described later. To that end the platform 22 is equipped with at least four lateral catches 24 which are retractable

25 in a horizontal plane. Fig. 1 illustrates the catches in the extended state. The platform is held by its catches on supports 26 formed on the internal wall of the shaft at the landing levels 12.

The machinery platform 22 is surmounted by a platform 27 on which a controller 29 and a control box 31 are installed. These are covered by a roof 33 on

which the workers perform their tasks.

The lifting system comprises a thrust platform 30 which is also equipped with laterally retractable catches 32 whereby it can rest on said supports 26.

5 At least one hydraulic, pneumatic or electric jack is attached to the thrust platform (two jacks 34, 36 in the case of the figure). The rod 38 of the jack or jacks is securely attached to the machinery platform 22. The extension and retraction of the jack or jacks, as well as that of the catches 24 and 32 are automatically controlled by a central control 40 located on the thrust platform.

10 The operation of the elevator system of the invention will now be explained. It is assumed that the elements of the elevator system are initially located in the respective positions shown in Fig. 1. The building has been constructed up to the level N+3. The machinery platform 22 is located at level N and the thrust platform 30 at level N+1.

15 After level N+4 has been constructed, the machinery platform must be brought to the level N+1. The operating sequence is as follows:

- the central control 40 orders a slight extension of the jacks 34, 36 sufficient to disengage the catches 24 from the support 26 on which they rest;

- the catches 24 are subsequently retracted;

20 - the central control 40 then signals for an extension of the jacks 34, 36 for a length that is equal to the height of one floor, which moves the machinery platform slightly above level N+1;

- the catches 24 are extended and the jacks 34, 36 are slightly retracted to allow positioning the catches 24 on the supports 26 of level N+1;

- the central control 40 then signals for a slight retraction of the jacks.

25 Since the machinery platform 22 cannot descend, it is the thrust platform 30 that is slightly raised above the supports on which it rests; the catches 32 of the thrust platform 30 are then retracted;

- the jacks 34, 36 are retracted to a length that is equal to the height of one floor, which moves the thrust platform 30 slightly above level N;



- the catches 32 are extended and the jacks 34, 36 are slightly extended so that the catches 32 are positioned on the supports on level N.

The lifting system is then in the position shown in Fig. 3. All the elements of the lifting system have exactly the same relative positions as in Fig. 1, but are shifted upwards by one floor. All the operations described in the above sequence are automatically controlled by the central 40.

It goes without saying that the system of the invention can also be used to lower the machinery platform. To that end the previously described operations only need to be performed in the reverse direction.

Instead of the jacks, two racks can be used as the jacking device. The racks may be connected to the machinery platform and to the thrust platform and mesh with motor-driven pinions. The lifting system has no limits in regard to power. It can therefore be used to lift any equipment which must be moved after a new floor has been constructed.

### Claims

What is claimed is:

1. A device for moving machinery along an elevator shaft during the construction of a building, characterized in that it includes:
  - 5 a machinery platform (22) that carries elevator machinery (20) and is mounted to move in said shaft (10), where said machinery platform is equipped to be supported (26) in the shaft at different levels;
  - a thrust platform (30) also mounted to move in the shaft, where said thrust platform is mounted at least lower in the shaft than the machinery platform, and is
  - 10 also equipped to be supported in the shaft at different levels;
  - and a jacking device (34, 36) linking the thrust platform (30) to the machinery platform (22), which is able to move the machinery platform vertically while being supported by the thrust platform, and to move the thrust platform while being supported by the machinery platform.
- 15 2. A lifting device as claimed in claim 1, characterized in that the jacking device is at least one pneumatic or hydraulic jack.
3. A lifting device as claimed in claim 1, characterized in that the jacking
- 20 device is a rack connected to the machinery platform and to the thrust platform, and that meshes with motor-driven pinions.
4. A lifting device as claimed in claim 1, characterized in that said jacking device (34, 36) and said catches (24, 32) are automatically controlled by a central
- 25 control 40 which is located on the thrust platform.

5. An method of operating the lifting device claimed in one of the preceding claims, characterized in that it comprises:

disengaging the machinery platform from it's support in the shaft;

extending the jacking device;

5 engaging the machinery platform to it's support in the shaft;

disengaging the thrust platform from it's support in the shaft;

retracting the jacking device; and

engaging the thrust platform to it's support in the shaft.

10 6. A method as claimed in claim 5, characterized in that the device is used to lift any equipment which must be moved after a new floor has been constructed.

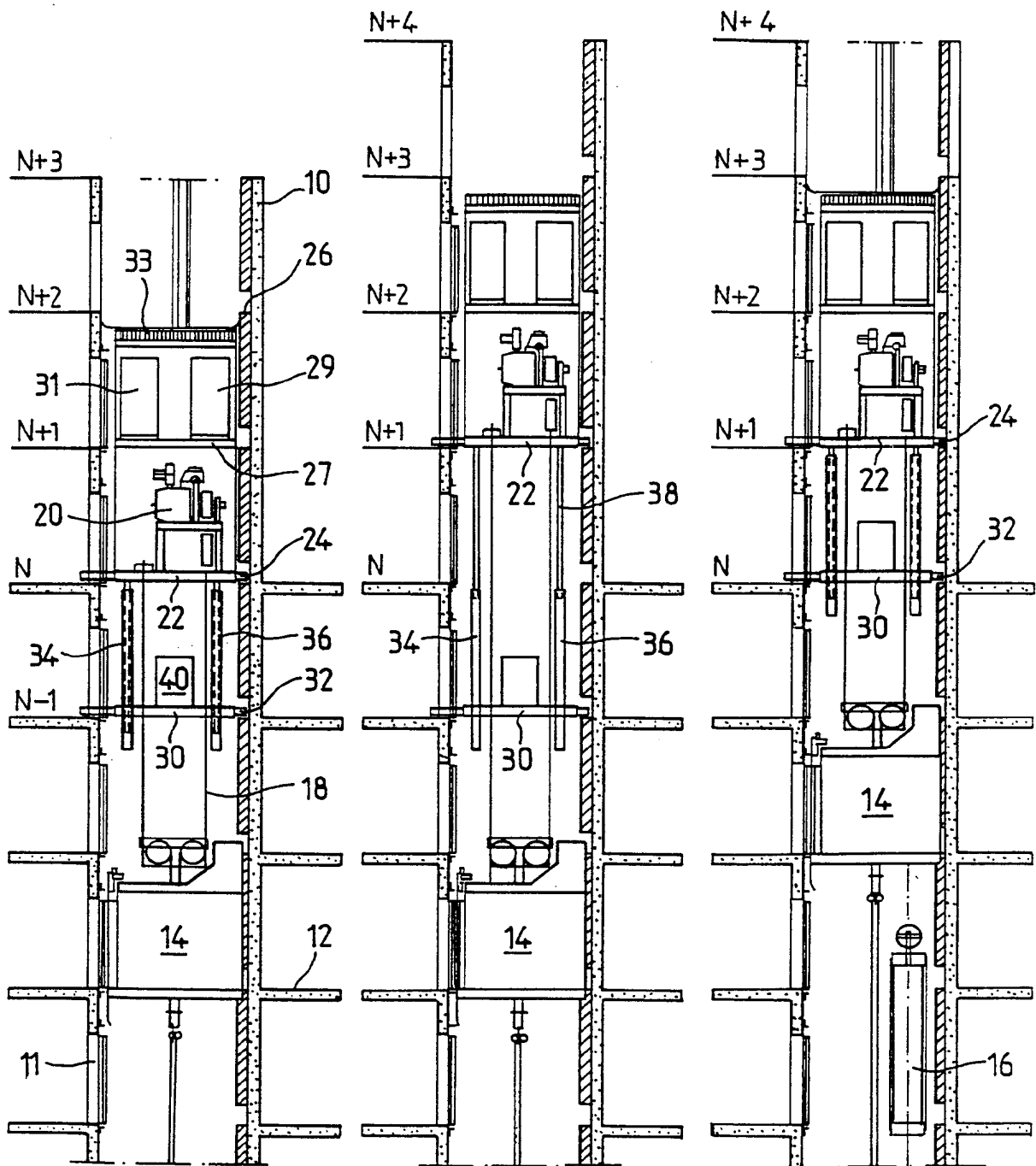


FIG. 1

FIG. 2

FIG. 3